



The **Vienna School of Mathematics (VSM)** is a joint graduate school of the mathematics faculties of the **University of Vienna** and the **TU Wien**. The VSM is devoted to top-level PhD education in all branches of mathematics. It fosters intra- and interdisciplinary scientific cooperation and networking among students and advisors and aims at increasing the international visibility of the Vienna area as a center for mathematics.

The VSM currently announces a four year PhD position in the area of

Higher-Order Flexibility of Geometric Structures (TU Wien, Supervisor: Georg Nawratil)

The position is funded by the Austrian Science Fund FWF through the same-titled project (Grant-DOI: 10.55776/PAT1144724) on the crossroads of kinematics, algebraic geometry and rigidity theory. The main goal is the determination of flexes associated with higher-order flexible structures using a global approach based on Puiseux series and tropical geometry. Moreover, it is planned to study generalizations of the averaging technique and to design/analyze examples with special properties regarding higher-order flexion, e.g. higher-order cusp mechanisms. This basic research finds application in the promising field of model flexors, which have high practical potential ranging from robotics over origami to engineering applications in architecture. For more details, candidates are referred to the following two recent works of the supervisor:

- A global approach for the redefinition of higher-order flexibility and rigidity. Mechanism and Machine Theory 205:105853 (2025) DOI: 10.1016/j.mechmachtheory.2024.105853
- On flexes associated with higher-order flexible bar-joint frameworks. arXiv:2502.01124 (2025)

The basic requirement for the position is a good working knowledge in some fields connected to the project, particularly, kinematics, algebraic geometry, rigidity theory, Puiseux series and tropical geometry. In addition, basic skills in operating the software Maple are expected.

The advertised position is associated with the Institute of Discrete Mathematics and Geometry of the TU Wien in the Research Group Differential Geometry & Geometric Structures, which is also part of the Center for Geometry and Computational Design. The successful candidate will become a member of the Vienna School of Mathematics and is expected to actively contribute to its activities. The extent of employment is 30 hours per week and the gross salary is 2786,10 EUR per month. The starting date of the position is flexible in or after September 2025.

Application Requirements and Procedure

The candidates must have a master degree (or equivalent) in Mathematics/Geometry at the moment the PhD position starts. The application documents should contain a letter of motivation, a CV, higher education certificates/diplomas, and letter(s) of recommendation preferably sent directly to nawratil@geometrie.tuwien.ac.at by the person writing the letter. Applications have to be sent to nawratil@geometrie.tuwien.ac.at, if possible in a single PDF file. The deadline for applications is **June 1, 2025**.